The Braymen device, even if so modified, would not achieve the claimed invention. Braymen in view of Partain, et al. would nevertheless not disclose, teach or suggest a gas plasma source that includes:

> a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity

as specified by claims 1 and 7, and therefore contained in claims 8-10 and 13 dependent on claim 7. The Office Action asserts that the solid state power source is laser 12 of Braymen and that the resonant cavity is a microwave resonant cavity described by Partain, et al. The laser cannot excite resonant oscillations in the microwave resonant cavity of Partain, et al. In the first place, the laser light ends at the oblation cell 20 when the laser light is consumed as it oblates material 14. There is no laser light coupled to the ICP source 32 (which the Office Action asserts to be the resonant cavity).

The Office Action fails to establish a *prima facie* case that claims 1, 7-10 and 13 would have been obvious to a person of ordinary skill in the art. The United States Supreme Court established the basic rules for analyzing an invention's obviousness and articulated three factual inquiries to be made in an obviousness determination. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). This analysis requires a factual inquiry into (1) the scope and content of the prior art, (2) the differences between the prior art and the claimed subject matter, and (3) the level of skill of a person of ordinary skill in the art at the time the invention was made. The M.P.E.P. instructs that "examiners should apply the test for patentability under 35 U.S.C. §103 set forth in *Graham*." See M.P.E.P. 2141 through 2143.

The determination of obviousness under 35 U.S.C. §103(a) is a legal conclusion that must be based on factual evidence. *Burlington Indus., Inc. v. Quigg*, 822 F.2d 1581, 1584, 3 USPQ2d 1436, 1439 (Fed. Cir. 1987). The results of the factual inquires articulated in *Graham v. John Deere Co.* provide the factual evidence upon which the legal conclusion of obviousness is to be based. It is respectfully submitted that the Office Action fails to support a legal conclusion of obviousness with factual evidence. Assertions of Patent Office personnel do not constitute evidence.

The Office Action fails to establish an adequate factual foundation for its assertion that the "solid state power source couples into the resonant cavity sufficient power to sustain a plasma in a gas disposed within the resonant cavity." The Office Action points to a section of Braymen (column 5, lines 50-55) that discloses an aerosol directed through line 30 to ICP

source 32. However, nowhere is there disclosed that the solid state power source couples into the resonant cavity or that sufficient power is coupled into the resonant cavity to sustain a plasma. According to Braymen, the laser light stops in ablation cell 20, and it is the ablated sample 25 of material of sample 14 (not the laser light) that is transported out of ablation cell 20 through tube 30 into the so called resonant cavity 32.

Even if, *arguendo*, the combination would achieve the present invention, the Office Action does not cite any motivation for modifying Braymen. To establish a *prima facie* case of obviousness, the Patent and Trademark Office must demonstrate by substantial evidence that the prior art relied upon, coupled with the knowledge generally available in the art that the time of the invention, contains some suggestion or incentive that would have motivated an ordinarily skilled person to modify the subject matter of a reference or combine the subject matters of the references to achieve the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). M.P.E.P. 2143.01 instructs that "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art."

Establishment of a suggestion or incentive to modify or combine prior art references requires substantial evidence of such suggestion or incentive. The factual question of motivation is material to patentability, and it cannot be resolved on a subjective belief of unknown authority. Office Action assertions of such suggestion or motivation, without a prior art reference as support, is merely subjective belief and is insufficient to constitute substantial evidence upon which a legal conclusion can be based. Substitution of common knowledge and common sense for a factual finding of motivation is nothing more than a conclusionary statement that does not fulfill the Patent and Trademark Office's obligation to set forth reasoned findings. *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002).

The Office Action fails to establish factual evidence of any teaching or suggestion to modify Braymen so that a "solid state power source couples into the resonant cavity a power level to sustain a plasma in a gas disposed within the resonant cavity" as specified in the claims. The Office Action asserts that it "would have been obvious to one of ordinary skill in the art to excite resonant oscillations in the resonant cavity so that the device can detects any small changes in the oscillation and resonant circuit structures." Braymen in view of Partain, et al. does not disclose, teach or suggest any benefit to exciting resonant oscillations in the cavity, resonant or not, that Braymen refers by numeral 32. Braymen in view of Partain, et

al. does not discuss the generation of a plasma for the ICP source 32. There is no benefit disclosed in Braymen or Partain, et al. to resonating microwaves in ICP source 32. Accordingly, there is not factual support for a motivation to make the modification posited by the Office Action, even if such modification would achieve the present invention. The factual question of motivation cannot be resolved on a subjective belief expressed in Office Action assertions without a prior art reference as support. Such an unsupported assertion is merely subjective belief and is insufficient to constitute substantial evidence upon which a legal conclusion can be based.

As to claim 2, the Office Action fails to establish a *prima facie* case that claim 2 would have been obvious to a person of ordinary skill in the art. The Office Action asserts, without reason, that 16 and 30 of Braymen could be replaced by a coaxial cable disclosed in Partain, et al. This assertion is respectfully traversed. If fused quarts optical fiber 16 of Braymen were replaced by a coaxial cable, then laser light would not reach oblation cell 20 to ablate material 14. If tube 30 of Braymen were replaced with a coaxial cable, then oblated material 14 could not reach ICP source 32. "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)." See M.P.E.P., section 2143.01, page 2100-99, Rev. 1, Feb. 2000, 7th Ed (emphasis in the original). Accordingly, there can be no suggestion or motivation for such modification.

Even if, *arguendo*, the device of Braymen modified to replace optical fiber 16 and tube 30 with a coaxial cable, were to still some how functional, the Office Action fails to provide assertions of, or factual evidence supporting, motivation for such a modification, and the applied art provides no evidentiary support for such motivation. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)." See M.P.E.P., section 2143.01, page 2100-98, Rev. 1, Feb. 2000, 7th Ed (emphasis in the original).

As to claim 3, the Office Action fails to establish a *prima facie* case that claim 3 would have been obvious to a person of ordinary skill in the art. The Office Action continues to assert that the claimed tube through the resonant cavity is inherent (as if needed to keep sample 25 from leaking). This assertion is respectfully traversed. A tube through a resonant

cavity does not necessarily follow from (and thus inherent in) the teachings about the resonant cavity. It is respectfully submitted that the Office Action reveals a lack of understanding as to the meaning of inherency. "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 171461, 1464 (Bd. Pat. App. & Inter. 1990). (emphasis in original). Also see M.P.E.P. 2112. The Office Action's technical reasoning (i.e., as if needed to keep sample 25 from leaking) fails "to reasonably support the determination that the allegedly inherent characteristic [i.e., tube through the resonant cavity] necessarily flows from the teachings of the applied prior art." For example, common household microwave ovens include a resonant cavity into which we place food to be cooked, and there is no tube disposed through the resonant cavity. Many other microwave resonant cavities are commonly found without a tube disposed through the resonant cavity. Braymen in view of Partain, et al. does not disclose, teach or suggest a tube disposed through resonant cavity 32.

The Office Action fails to establish a *prima facie* case that claims 14 and 16-17 would have been obvious to a person of ordinary skill in the art. Method claim 14 and dependent claims 16 and 17 remain unamended. The Office Action continues to assert that "the reference [Braymen in view of Partain et al.] meets all the claimed structure, and therefore inherently must be capable of this use [method claims 14 and 16-17] in the same manner as structure of the claims." This assertion is respectfully traversed.

As discussed above, with respect to claim 3, the Office Action's technical reasoning (i.e., the reference meets all the claimed structure therefore its use must be inherent) fails "to reasonably support the determination that the allegedly inherent characteristic [i.e., exciting the resonant cavity with signal power from a solid state power source] necessarily flows from the teachings of the applied prior art." In the first place, as discussed with respect to claims 1 and 7, Braymen in view of Partain, et al. does not disclose, teach or suggest a gas plasma source that includes:

> a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity;

and therefore, the premise (i.e., the reference meets all the claimed structure therefore its use must be inherent) upon which the Office Action asserts inherency is false. Secondly,

inherency is a factual finding that must be supported by substantial evidence, and the Office Action has submitted no evidence of the necessity that the use must follow the structure.

Accordingly, the withdrawal of the rejections of claims 1-3, 7-10, 13-14 and 16-17 is earnestly solicited.

B. The Office Action rejects claim 6 under 35 U.S.C. §103(a) as being unpatentable over Akiyoshi et al. in view of Partain et al. This rejection is respectfully traversed.

The Office Action fails to establish a *prima facie* case that claim 6 would have been obvious to a person of ordinary skill in the art. The Office Action asserts that FIG. 12 of Akiyoshi et al. discloses a gas plasma emission source. This assertion is respectfully traversed. In contrast, FIG. 12 of Akiyoshi et al. discloses only a laser irradiation head 402. There is no plasma generated in head 402. In fact, column 15 discloses that head 402 includes port 411 that is coupled to an ICP spectrometer (see lines 29-35). The term ICP is an abbreviation for inductively coupled plasma. There is no disclosure of head 402 of Akiyoshi et al. generating a plasma.

The Office Action, line 21 of page 3, characterizes 409 of FIG. 12 of Akiyoshi et al. as a resonant cavity. This characterization is respectfully traversed. In contrast, Akiyoshi et al. describes 409 of FIG. 12 to be a laser irradiation cell.

Then on lines 2 through 5 of page 4, the Office Action acknowledges that Akiyoshi et al. "does not disclose the resonant cavity to excite resonant oscillations in the resonant cavity (see column 9, lines 19-52)." The Office Action goes on to assert that "Partain, et al. discloses the resonant cavity to excite resonant oscillations in the resonant cavity (see column 9, lines 19-52)." By this argument, the Office Action appears to be asserting that the laser irradiation cell 409 of Akiyoshi et al. is modified according to the teachings of Partain, et al. to be microwave resonant cavity 32 of Partain et al. This argument is respectfully traversed.

The Akiyoshi et al. laser irradiation cell 409, even if so modified, would not achieve the claimed invention. Akiyoshi et al. in view of Partain, et al. would nevertheless not disclose, teach or suggest a gas plasma source that includes:

> a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity

as specified by claim 6. In contrast, laser 401, 402 of Akiyoshi et al., even as modified by Partian, et al., does not disclose exciting resonant oscillation in a resonant cavity. The laser light from Braymen cannot excite resonant oscillations in the microwave resonant cavity of Partain, et al.

Even if, *arguendo*, the combination would achieve the present invention, the Office Action does not cite any motivation for modifying Akiyoshi et al.. The Office Action asserts that it "would have been obvious to one of ordinary skill in the art to excite resonant oscillations in the resonant cavity so that the device can detects any small changes in the oscillation and resonant circuit structures." Still, there is no motivation for modifying Braymen's ICP source 32 to be a resonant cavity. Akiyoshi et al. derives no benefit from detecting "any small changes in the oscillation and resonant circuit structures," does not detect any such small changes, and is not directed to using the small changes. Akiyoshi et al. generates particals for transport through port 411 and derives no benefit from microwave resonance in laser irradiation cell 409.

Accordingly, the withdrawal of the rejection of claim 6 is earnestly solicited.

C. The Office Action rejects claims 4-5, 11-12, 15 and 18-20 under 35 U.S.C. §103(a) as being unpatentable over Braymen in view of Partain, et al.. This rejection is respectfully traversed.

The Office Action fails to establish a *prima facie* case that claims 4-5, 11-12, 15 and 18-20 would have been obvious to a person of ordinary skill in the art. The Office Action fails to establish an adequate factual foundation for its assertion that "It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a power level that does not damage the cable, since it has been held that discovering an optimal value of a result effective variable involves only routine skill in the art. One would have been motivated to choose a power level for the purpose of minimizing a possibility of damaging cable between the power source and the resonant cavity."

To establish a *prima facie* case of obviousness, the Patent and Trademark Office must demonstrate by substantial evidence that the prior art relied upon, coupled with the knowledge generally available in the art that the time of the invention, contains some suggestion or incentive that would have motivated an ordinarily skilled person to modify the subject matter of a reference or combine the subject matters of the references to achieve the claimed subject matter as discussed with respect to the rejection of claims 1 and 7, above.

The Office Action fails to establish factual evidence of any teaching or suggestion to modify Braymen so that the power level would be less than 300 watts or less than 100 watts as specified in the claims. The substantial evidence requirement to establish a *prima facie* case of obviousness and the requirement to establish an incentive or suggestion to modify or combine is as discussed above with respect to the rejection of claims 1 and 7. The Office Action asserts, without evidentiary support, that it "would have been obvious to one of ordinary skill in the art at the time the invention was made to choose a power level that does not damage the cable, since it has been held that discovering an optimal value of a result effective variable involves only routine skill in the art. One would have been motivated to choose a power level for the purpose of minimizing a possibility of damaging cable between the power source and the resonant cavity." Certainly Braymen provides no evidence that the power level should be less than 300 watts. Braymen seeks to deliver considerable power to oblate material 14. Moreover, the Office Action fails to establish or even assert factual evidence of any teaching or suggestion that "the plasma constitutes a fluctuating load on the solid state power source" or that the power level is substantially stable with respect to the fluctuating load" as specified in claims 4-5, 11-12.

The Office Action further asserts that "It is further noted that the reference [Brayman in view of Partain, et al.] meets all the claimed structure as set forth in support of the manner of using the device, and therefore inherently must be capable of this use in the same manner as structure of the claims." This assertion is respectively traversed. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)." See M.P.E.P., section 2143.01, page 2100-98, Rev. 1, Feb. 2000, 7th Ed (emphasis in the original).

Furthermore, not only does Braymen lack any suggestion to limit the power source to any particular power level, such modification would not even be attempted as it would be counter to the needs of the Braymen device to transport as much laser signal power as possible to ablation cell 20 in order to ablate material 14 and produce sample 25. "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)." See M.P.E.P., section 2143.01, page 2100-99, Rev. 1, Feb. 2000, 7th Ed (emphasis in the original).

Accordingly, the withdrawal of the rejections of claims 4-5, 11-12, 15 and 18-20 is earnestly solicited.

CONCLUSION

In view of the present remarks, withdrawal of the rejection of claims 1-20 is earnestly solicited. It is respectfully submitted that the present application is in condition for allowance. Prompt reconsideration and allowance of the application are earnestly solicited. Should the examiner believe that any further action is necessary to place the application in condition for allowance, the examiner is invited to contact the undersigned applicant representative at the telephone number listed below.

The Commissioner is hereby authorized to charge any fees (or credit any overpayment) associated with this communication to Deposit Account No. 50-1078.

Respectfully submitted,

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